07/29/98 jc596 U.S. PTO

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PTO/SB/05 (12/97)
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jc514 U.S. PTO 09/124642 07/29/98

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.: 42390.P6189 Total Pages 2

First Named Inventor or Application Identifier: Jie Ni

Express Mail Label No.: EM 531 556 976 US **Date Filed.:** July 29, 1998

ADDRESS TO: **Assistant Commissioner for Patents**
Box Patent Application
Washington, D. C. 20231

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents.

1. XX Fee Transmittal Form
(Submit an original, and a duplicate for fee processing) (Total Pages 4)

2. XX Specification (Total Pages 10)
(preferred arrangement set forth below)
- Descriptive Title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claims
- Abstract of the Disclosure

3. XX Drawings(s) (35 USC 113) (Total Sheets 1 (1 Figure)

4. XX Oath or Declaration (Total Pages 3 - UNSIGNED)

a. _____ Newly Executed (Original or Copy)

b. _____ Copy from a Prior Application (37 CFR 1.63(d))
(for Continuation/Divisional with Box 17 completed) **(Note Box 5 below)**

c. _____ DELETIONS OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

5. _____ Incorporation By Reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. _____ Microfiche Computer Program (Appendix)

7. _____ Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. ___ Computer Readable Copy
b. ___ Paper Copy (identical to computer copy)
c. ___ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. _____ Assignment Papers (cover sheet & documents(s)) (Total Pages _____)

9. _____ a. 37 CFR 3.73(b) Statement (where there is an assignee)
_____ b. Power of Attorney

10. _____ English Translation Document (if applicable)

11. XX a. Information Disclosure Statement (IDS) & PTO-1449 (Total Pages 3)
XX b. Copies of IDS Citations (Total Citations 2)

12. _____ Preliminary Amendment (Total Pages _____)

13. XX Return Receipt Postcard (MPEP 503) (Should be specifically itemized)

14. _____ a. Small Entity Statement(s)
b. Statement filed in prior application, Status still proper and desired

15. _____ Certified Copy of Priority Document(s) (if foreign priority is claimed)

16. XX Other: **Separate Sheet: Attorney Signature, Certificate of Mailing, and copy of Return Postcard (Total Pages 1)**

17. **If a CONTINUING APPLICATION,** check appropriate box and supply the requisite information:

____ Continuation ____ Divisional ____ Continuation-in-part (CIP)

of prior application No: _____

18. **Correspondence Address**

_____ Customer Number or Bar Code Label _____ (Insert Customer No. or Attach Bar Code Label here)

or

XX Correspondence Address Below

NAME **Howard A. Skaist (Reg. No. 36,008)**

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

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ATTORNEY DOCKET NO.: 42390.P6189 **EXPRESS MAIL NO.: EM 531 556 976 US**

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FEE TRANSMITTAL

TOTAL AMOUNT OF PAYMENT ($) 790.00

Complete if Known:
Application No.:
Filing Date: **July 29, 1998**
First Named Inventor: **Jie Ni**
Group Art Unit:
Examiner Name:
Attorney Docket No.: **42390.P6189**
Express Mail No.: . EM 531 556 976 US

METHOD OF PAYMENT (check one)

1. [ ] The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

   Deposit Account Number **02-2666**
   Deposit Account Name

   [**XXX**] Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

   [ ] Charge the Issue Fee Set in 37 CFR 1.18 at the Mailing of the Notice of Allowance, 37 CFR 1.131(b)

2. **XXX** Payment Enclosed
   XXX Check
   _____ Money Order
   _____ Other

FEE CALCULATION (fees effective 10/01/97)

1. FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	790	201	395	Utility application filing fee	**$ 790.00**
106	330	206	165	Design application filing fee	
107	540	207	270	Plant filling fee	
108	790	208	395	Reissue filing fee	
114	150	214	75	Provisional application filing fee	
				SUBTOTAL (1)	**$ 790.00**

2. CLAIMS

			Extra		Fee from below		Fee Paid
Total Claims	**19**	- 20 =	**0**	X	**$22**	=	**$ 0.00**
Independent Claims	**3**	- 3 =	**0**	X	**$82**	=	**$ 0.00**
Multiple Dependent Claims				X		=	

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
103	22	203	11	Claims in excess of twenty	**$ 0.00**
102	82	202	41	Independent claims in excess of 3	**$ 0.00**
104	270	204	135	Multiple dependent claim	
109	82	209	41	Reissue independent claims over original patent	
110	22	210	11	Reissue claims in excess of 20 and over original patent	
				SUBTOTAL (2)	**$ 0.00**

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for response within first month	
116	400	216	200	Extension for response within second month	
117	950	217	475	Extension for response within third month	
118	1,510	218	755	Extension for response within fourth month	
128	2,060	228	1,030	Extension for response within fifth month	
119	310	219	155	Notice of Appeal	
120	310	220	155	Filing a brief in support of an appeal	
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive unavoidably abandoned application	
141	1,320	241	660	Petition to revive unintentionally abandoned application	
142	1,320	242	660	Utility issue fee (or reissue)	
143	450	243	225	Design issue fee	
144	670	244	335	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	790	246	395	For filing a submission after final rejection (see 37 CFR 1.129(a))	
149	790	249	395	For each additional invention to be examined (see 37 CFR 1.129(a))	

Other fee (specify) _____ _____

Other fee (specify) _____ _____

SUBTOTAL (3) $ 0.00

*Reduced by Basic Filing Fee Paid

SUBMITTED BY:

Typed or Printed Name: **Robert A. Diehl**

Signature Robert A. Diehl Date **July 29, 1998**

Reg. Number **40,992** Deposit Account User ID _____ (complete if applicable)

ATTORNEY DOCKET NO.: . 42390.P6189
EXPRESS MAIL NO.: EM 531 556 976 US

"Express Mail" mailing label number EM531556976US
Date of Deposit July 29, 1998
I hereby certify that I am causing this paper or fee to be deposited with the United States Postal Service "Express Mail Post Office to Addressee" service on the date indicated above and that this paper or fee has been addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231
Signature 7-29-98 Date

APPLICATION FOR UNITED STATES LETTERS PATENT

FOR

METHOD AND APPARATUS FOR SYNCHRONIZING A NETWORK LINK

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METHOD AND APPARATUS FOR SYNCHRONIZING A NETWORK LINK

BACKGROUND

Field

The present invention relates to networking, and more particularly, to bi-directionally synchronizing two ends of a network link.

Background Information

As is well-known, when forming a network, it is desirable to synchronize the devices across a link. For example, a device at a first end should be synchronized with a device at a second end. Typically, network protocols, such as, for example, IEEE draft P802.3Z/D5.0, available from the IEEE Standards Department, Copyright Information, 445 Hoes Lane, P. O. Box 1331, Piscataway, NJ 08855-1331, published May 6, 1998, are employed in order to provide this synchronization across a network link. However, network links fail for a variety of reasons. It would be desirable if it were possible to synchronize a network link in a fashion that might provide diagnostics and, in some cases, recovery when communication across the link fails to occur.

SUMMARY

Briefly, in accordance with one embodiment of the invention, a method of synchronizing two ends of a bi-directional network communication path includes the following. A sequence of predetermined characters are repeatedly transmitted from an end of a bi-directional network communication path if reception is lost at that end. Synchronization or resynchronization occurs from both ends if the sequence of predetermined characters is received at the other end.

BRIEF DESCRIPTION OF THE DRAWINGS

The subject matter regarded as the invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention, however, both as to organization and method of operation, together with objects, features, and advantages thereof, may best be understood by reference to the following detailed description when read with the accompanying drawings in which:

FIG. 1 is a state diagram illustrating an embodiment of a method of synchronizing a network link in accordance with the present invention.

DETAILED DESCRIPTION

In the following detailed description, numerous specific details are set forth in order to

provide a thorough understanding of the invention. However, it will be understood by those skilled in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, components and circuits have not been described in details so as not to obscure the present invention.

In this context, the term synchronization refers to establishing an electrical link bi-directionally between two points at two ends of a network link, such as coupled by a cable or a wire. Synchronization is employed to ensure that a voltage is successfully transferred bi-directionally from one point or one end to another point or the other end. Once this is established in a network, higher level protocols in the stack may operate to effectuate communication across the network; however, if this synchronization is not established, then the higher level protocols will not function properly. Typically, when synchronization occurs, in addition to recognizing voltage or energy transported across a wire cable or link, also certain patterns are identified bi-directionally by both ends of a full duplexed link. Synchronization, for example, is employed in the IEEE 802.3 specification, published in 1996, (hereinafter referred to as the "ethernet specification") and in the aforementioned IEEE 802.3z specification (hereinafter referred to as the "gigabit ethernet specification"). These specifications are available from the IEEE Standards Department, Copyright Information, 445 Hoes Lane, P. O. Box 1331, Piscataway, NJ 08855-1331

Typically, although the invention is not limited in scope in this respect, in this embodiment, synchronization is established and then indicated or signaled to an end user, such as by a light emitting diode (LED) or other mechanism on a particular system, at both ends of the link. Such signals are employed as a diagnostic tool to inform the end user whether the link is "up" or the link is "down." One problem, that occurs with systems that comply with the ethernet specification or the gigabit ethernet specification, is that a link up signal may be provided to the end user, although the link may not be properly synchronized, as desired. Therefore, in this respect, an ethernet specification compliant system or gigabit ethernet specification compliant system may not be sufficiently reliable for some situations. For example, in the case of servers employed in a network, due to the size and the potential impact of a server being down, it is desirable to achieve a greater level of reliability than is available using an ethernet or gigabit ethernet specification compliant protocol. In addition, it is desirable in a system providing such additional reliability, that it not be compatible with an ethernet or gigabit ethernet specification compliant protocol, so as not to result in confusion for a system compliant with such an approach, by successfully interacting with a system that employs a protocol complying with the ethernet or gigabit ethernet specification.

In this context, a protocol compliant device may have a transmit process and a receive process implemented in the physical or physical protocol (PHY) layer, although the invention is not limited in scope in this respect. Furthermore, although the invention is not limited in scope in this respect, characters that may be transmitted and received by these processes are defined, for example, in the Wekiva (NGIO) Architecture: Link Specification, version 0.9, dated July 15, 1998, herein incorporated by reference, available from Intel Corp., Santa Clara, CA, hereinafter referred to as the "NGIO specification," and are compliant with the standard 8B/10B encoding process.

The synchronization detection process for one embodiment in accordance with the present invention is illustrated in FIG. 1. The synchronization process determines whether the link that couples to the receive process is ready for operation. Full synchronization happens on a full duplex link. Therefore, in this particular embodiment, both sides or ends of the link engage in an operation, described in more detail hereinafter, to establish synchronization, substantially at the same time. Partial synchronization occurs between a transmit process and receive process on opposite sides of the link after the synchronization process on the receive process side receives three specific consecutive characters, specified as idle 1 characters for this particular embodiment, as described hereinafter. Of course, the invention is not restricted in scope to these particular characters or to any particular characters.

FIG. 1 illustrates for this embodiment the operations performed by one end of the link, although both ends may be engaging in these operations. As illustrated in FIG. 1, when power is turned on, or reset occurs, indicated for this particular embodiment by the appropriate state variables being true, the synchronization process enters state 110, referred to as the loss of sync (LOS) state in this context. The process will remain in this state until the process receives an idle 1 character. During the LOS state, the transmit process will send idle 1 characters out onto the link. While in the LOS state, the synchronization process waits until it receives an idle 1 character and then moves to the idle 1 detect state, state 120. The output signal of state 110 is "link not good". Therefore, in this particular embodiment, at both ends of the link, under desired operating conditions, a particular system or node is both transmitting and receiving an idle 1 character. It is noted, as previously indicated, that the invention is not limited in scope to the particular character received and transmitted. In this particular embodiment, the aforementioned idle character is the "idle 1" character, as defined in the aforementioned specification, although any character may be employed, whether defined by the aforementioned specification or not.

If the synchronization process receives another consecutive idle 1 character while in state 120, the process moves to state 130. If the synchronization process does not receive a consecutive idle 1 character or receives a different character, the process returns to the loss of

sync (LOS) state. In state 120, the transmit process continues to send idle 1 characters. The output signal of this particular state is also a "link not good" signal. If the synchronization process receives yet another consecutive idle 1 character while in state 130, the process enters state 140. If the synchronization process does not receive a consecutive idle 1 character or it receives a different character, the process returns to the LOS state. Again, in state 130, the transmit process continues to send idle 1 characters and the output signal of the state is also link not good. In state 140, the process transmits three additional idle 1 characters. The synchronization process then moves to state 150. The output signal of this state is also link not good. Three consecutive idle 1 characters, as specified in the NGIO specification, for example, are different with respect to the idle characters of the gigabit ethernet specification. Therefore, this particular embodiment is not compatible with the gigabit ethernet specification, although the invention is not limited in scope in this respect. For a system complying with the gigabit ethernet specification to synchronize, after three consecutive idle 1 characters, as defined in the IEEE 802.3z specification, are received, these idle characters being different than those specified in the NGIO specification, the receiver is expected to receive configuration characters that would allow both sides of the link to communicate properly. For this embodiment in accordance with the invention, however, a synchronization process would be waiting for "idle 2" characters, as described hereinafter, which would never occur if coupled by a link to a node complying with the ethernet specification. Therefore, this provides an advantage in that the protocols will not be compatible and lead to the confusion, as previously described, regarding linking two nodes compliant with different protocols.

In state 150, the link is partially synchronized. While in this state, the synchronization process is waiting to receive another character referred to in this context as an "idle 2 character." Again, for this embodiment, this character is defined in the NGIO specification, although the invention is not limited in scope in this respect. The transmit process is transmitting idle 2 characters over the link. One advantage of this approach is that the synchronization process has received good idle 1 characters, as desired, but has not yet confirmed if the receive process at the other end of the link has been receiving the idle 1 characters transmitted across the link by its adjacent or associated transmit process. Therefore, when an idle 2 character is received in the synchronization process, this end of the link has confirmed that its adjacent or accociated transmit process is operating properly. After the synchronization process receives the idle 2 character, the synchronization process moves to state 160. This state 160 indicates that the link is good, as described in more detail below. The output signal of state 150, however, is a link not good signal. If state 150 does not receive an idle 2 character in a predetermined amount of time, the synchronization process enters the loss of sync state.

In state 160, the output signal to the data link is a link good signal. In this particular embodiment, the signal communicates to the data link layer that the link is fully synchronized and flow control characters may be transmitted and received across the link. The synchronization process remains in this state until either nonvalid data is received or an idle 1 character is received. If nonvalid data is received, the synchronization process enters state 145, which continues to test the data received employing multiple sub-stages that effect or accomplish hysteresis to enter the loss of sync state. More specifically, in this embodiment, a sub-process is begun in which the data received is assessed to determine whether the data is good or bad. If sufficient bad data is received, then the loss of sync state is entered, otherwise, if sufficient good data is received, than the link is determined to be good. More specifically, if an idle 1 character is received while in state 160, the synchronization process enters state 170. The output signal of this state is still a link good signal. However, if the synchronization process receives seven consecutive idle 1 characters, it will enter the loss of sync state. If the synchronization process receives nonvalid data in state 170, the process will enter state 145, however, if the process receives good data, but not an idle 1 character, the process moves back to state 160.

As the previous description indicates, in this particular embodiment, if reception is lost at one end of the link, an idle 1 character will be repeatedly transmitted by that end. Of course, the invention is not limited in scope in this respect and any sequence of predetermined characters may be transmitted. This may occur if one end of the link receives bad data and enters state 110, which would begin transmitting the idle 1 character in this embodiment, as previously described. The other end of the link, upon receiving idle characters, would also enter the loss of sync state 110. Therefore, in this case, resynchronization of the link occurs from both ends. If the sequence of predetermined characters is received at the other end, resynchronization of both ends would begin in the manner previously described for synchronization, for this embodiment.

As previously indicated, one advantage of this particular embodiment is as a diagnostic tool. With this embodiment, when one end of the link fails to receive good data, this initiates the diagnostic process that may ultimately result in resynchronization of the link from both ends and also result in signaling to the end user that a loss of synchronization has occurred. In alternative approaches, this signaling, diagnostic, and recovery would not have occurred and, instead, the loss of bad data may result in an error at a higher level protocol and in time consuming and costly diagnostics and investigation of the network to determine the cause.

Many embodiments of an apparatus or system for synchronizing a network link in accordance with the present invention are possible. For example, a network interface unit may be adapted to implement an embodiment of a method for synchronizing a network link in accordance

with the invention, such as the embodiment illustrated in FIG. 1. Likewise, a system including a bi-directional communication path including nodes coupled at each end may be similarly adapted to implement such an embodiment.

While certain features of the invention have been illustrated and described herein, many modifications, substitutions, changes, and equivalents will now occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.

DRAFT 09/09/98

Claims:

1. A method of synchronizing two ends of a bi-directional network communication path comprising:

repeatedly transmitting from an end of the bi-directional communication path a sequence of predetermined characters if reception is lost at that end; and

resynchronizing the link from both ends if the sequence of predetermined characters is received at the other end.

2. The method of claim 1, wherein the predetermined character comprises an idle 1 character.

3. The method of claim 2, wherein the sequence of predetermined characters comprises seven successive idle 1 characters.

4. The method of claim 1, and further comprising:

signaling the loss of synchronization after reception is lost.

5. The method of claim 1, wherein resynchronization at an end comprises detecting and transmitting three successive idle 1 characters.

6. The method of claim 5, wherein resynchronization at an end further includes detecting and transmitting an idle 2 character.

7. The method of claim 6, and further comprising:

returning to loss of synchronization if an idle 2 character is not detected at an end within a predetermined amount of time.

8. The method of claim 6, and further comprising:

applying a hysteresis sub-process at end end if nonvalid data is received at that end after resynchronization has occurred at both ends.

9. The method of claim 5, and further comprising:

returning to loss of synchronization if three successive idle 1 characters are not detected at an end.

10. An apparatus adapted to synchronize two ends of a bi-directional network communication path comprising:

a network interface unit adapted to repeatedly transmit from an end of the bi-directional communication path a predetermined character if reception is lost at that end;

said network interface unit being further adapted to detect a predetermined set of characters signaling to resynchronize the link from that end if reception is lost at the other end.

11. The apparatus of claim 10, wherein the predetermined character comprises an idle 1 character.

12. The apparatus of claim 10, wherein the predetermined set characters comprises three successive idle 1 characters.

13. The apparatus of claim 10, wherein said network interface unit is further adapted to detect and transmit another set of predetermined characters after detecting said set of predetermined characters.

14. The apparatus of claim 13, wherein said set of predetermined characters comprises three successive idle 1 characters and the another set of predetermined characters comprises an idle 2 character.

15. The apparatus of claim 10, wherein said network interface unit is further adapted to resynchronize the link from that end if seven successive idle 1 characters are received.

16. A system comprising:

a bi-directional communication path;

nodes coupled at each end of the bi-directional communication path;

said nodes being adapted to bi-directionally resynchronize the link so that if reception is lost at one end.

17. The system of claim 16, wherein said nodes are adapted to comply with the NGIO specification.

18. The system of claim 16, wherein each of said nodes are incompatible with nodes complying with the ethernet specification.

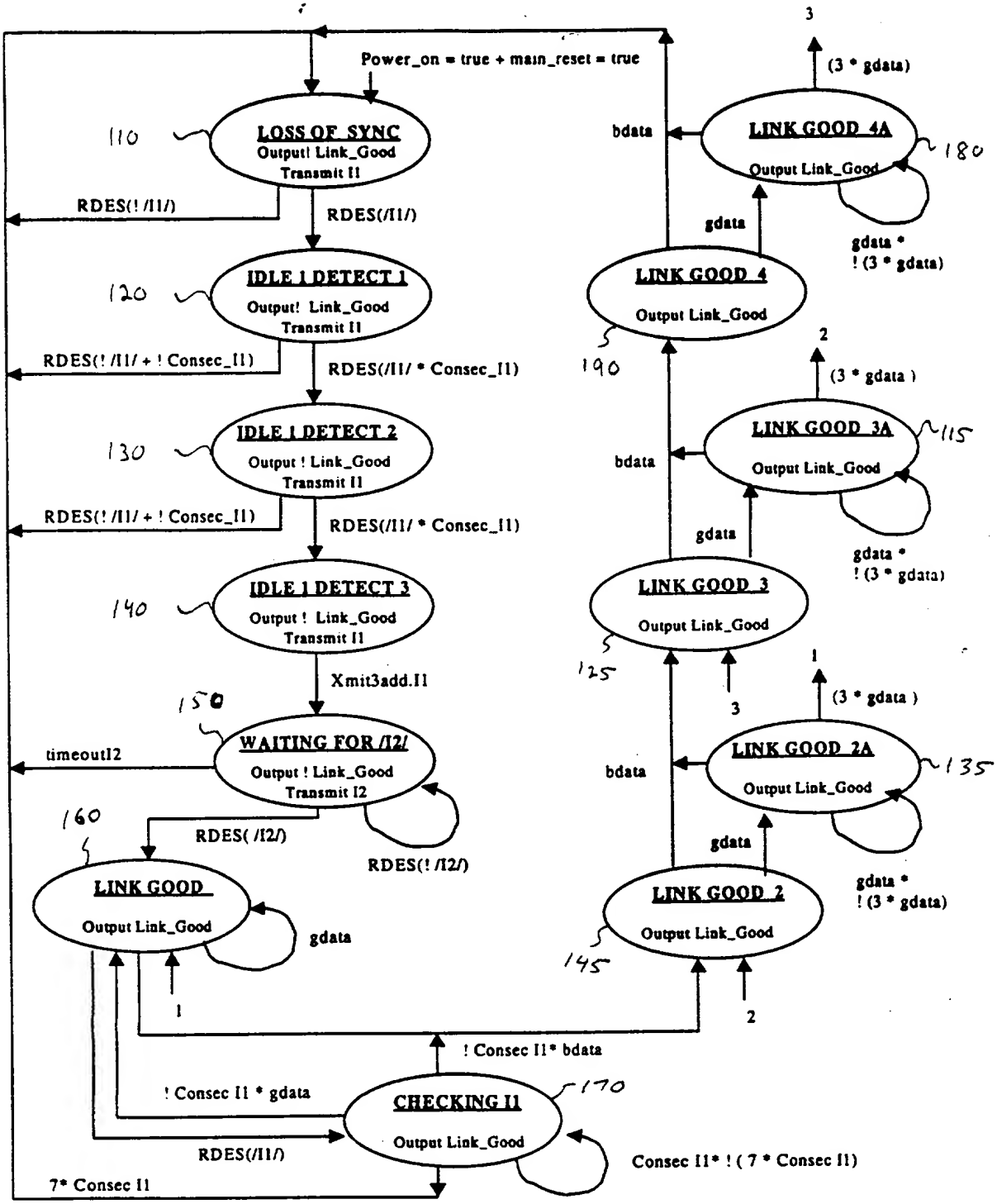
19. The system of claim 16, wherein each of said nodes are incompatible with nodes complying with the gigabit ethernet specification.

Abstract

Briefly, in accordance with one embodiment of the invention, a method of synchronizing two ends of a bi-directional network communication path includes the following. A sequence of predetermined characters are repeatedly transmitted from an end of a bi-directional network communication path if reception is lost at that end. Synchronization or resynchronization occurs from both ends if the sequence of predetermined characters is received at the other end.

EXPRESS MAIL NO. EL 000 000 000 US

FIG. 1



P6189
Sheet 1 of 1 Sheet

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION (FOR INTEL CORPORATION PATENT APPLICATIONS)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND APPARATUS FOR SYNCHRONIZING A NETWORK LINK

the specification of which

[XXX] is attached hereto.
[ ] was filed on _____
as United States Application Number _____
or PCT International Application Number _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	(Yes)	(No)
(Number)	(Country)	(Day/Month/Year Filed)	(Yes)	(No)
(Number)	(Country)	(Day/Month/Year Filed)	(Yes)	(No)

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

(Application Number)	(Filing Date)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Number)	**(Filing Date)**	**(Status -- patented, pending, abandoned)**

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Attorney's Docket No.: 042390.P6189

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